[10191/3280]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:		: Examiner: M. Cleveland
	Walter BECK et al.	:
For:	METHOD FOR PRODUCING A CONDUCTIVE COATING ON AN INSULATING SUBSTRATE	:
Filed:	September 22, 2003	: Art Unit: 1762
Serial No.:	**10/668,472**	

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Date: 2/4/2008

Signature:

AARON C. DEDITCH
(33,865)

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APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

SIR:

In the above-identified patent application ("the present application"), Appellants mailed a Notice Of Appeal on July 30, 2007 (it was filed on August 2, 2007) from the Final Office Action issued by the U.S. Patent and Trademark Office on February 2, 2007, so that the two-month appeal brief due date is October 2, 2007, which has been extended by four (4) months to February 4, 2008 (February 2, 2008 was a Saturday) by the accompanying Transmittal and Petition to Extend.

In the Final Office Action, claims 1, 4 to 8 and 11 to 14 were finally rejected. A Response After A Final Office Action was mailed on May 7, 2007, and an Advisory Action was mailed on June 4, 2007.

It is understood for purposes of the appeal that any Amendments to date have already been entered by the Examiner, including those in the Response After Final as indicated in the Advisory Action mailed on June 4, 2007 at number 7.

As to the length of the "concise explanation" of the subject matter defined in each of the claims involved in the appeal (see 41.37), the "concise explanation" language is like the "concise explanation" requirement of former Rule 37 C.F.R. § 1.192. Accordingly, the length of the concise explanation provided is acceptable, since it would have been acceptable under 37 C.F.R. § 1.192 and since it specifically defines the subject matter of the independent claims involved and in the appeal. In the filing of many appeal briefs under the old rule for the present Assignee, the length of the "concise explanation" has always been ultimately accepted by the Patent Office.

It is therefore respectfully submitted that this Appeal Brief complies with 37 C.F.R. § 41.37. Although no longer required by the rules, this Brief is submitted in triplicate as a courtesy to the Appeals Board.

It is respectfully submitted that the final rejections of claims 1, 4 to 8 and 11 to 14 should be reversed for the reasons set forth below.

1. REAL PARTY IN INTEREST

The real party in interest in the present appeal is Robert Bosch GmbH ("Robert Bosch") of Stuttgart in the Federal Republic of Germany. Robert Bosch is the assignee of the entire right, title and interest in the present application.

2. RELATED APPEALS AND INTERFERENCES

There are no interferences or other appeals related to the present application, which "will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal".

3. STATUS OF CLAIMS

A. Claim 14 was rejected under 35 U.S.C. § 112 as a duplicate of claim 1.

B. Claims 1, 4 to 8 and 11 to 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 6,406,939 ("Lin") in view of United States Published Patent Application No. 2003/0080392 ("Zuniga-Ortiz"), and United States Patent No. 6,372,539 ("Bayan") and Official Notice.

Appellants therefore appeal from the final rejections of pending and considered claims 1, 4 to 8 and 11 to 14. A copy of all of the pending and considered and appealed claims 1, 4 to 8 and 11 to 14 is attached hereto in the Claims Appendix.

4. STATUS OF AMENDMENTS

In response to the Final Office Action mailed on February 2, 2007, Appellants filed a Response After A Final Office Action on May 7, 2007. Amendments in the Response After Final have already been entered by the Examiner as indicated in the Advisory Action mailed on June 4, 2007 at number 7. It is understood for purposes of the appeal that any Amendments to date have already been entered.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The concise explanation of the summary of the claimed subject matter is as follows, as described in the context of the present application.

As in claim 1 and 11, the specification and Figures disclose and describe the following:

The "Background Information" section explains that in modern electronics, the trend is toward a reduction in component sizes and toward the integration of passive components, so that increasing integration density of integrated circuits can be met. One technology for achieving this goal is low-temperature co-fired ceramic (LTCC) which refers to a glass-ceramic mixture that, together with metallization pastes made, e.g., from Ag, AgPd, or Au, which is fired at a relatively low temperature that is below the melting point of the metals. (See specification, page 1, lines 6 to 13).

The presently claimed subject matter provides the benefit of a particularly simple and therefore economical method for producing a metal coating in the context of LTCC and ceramic substrates. Previously usual nickel and gold baths can be omitted, so that the process sequence is simpler and therefore more reliable. The coatings produced using the method according to the claimed subject matter have proven to be outstandingly suitable for producing bonding connections. (See specification, page 1, line 16 to 21).

As to claims 1 and 11, they are to a method for producing a conductive layered coating on an electrically insulating substrate. The specification discloses that the method is based on an electrically insulating substrate 1 that is coated locally with a layer of a first metal 2 (Figure 1 and step 20 in Figure 5). (See specification, page 2, lines 6 to 7).

As to claims 1 and 11, they also include the feature of equipping, in selected regions, at least one surface of an electrically insulating substrate with: a coating of an electrically highly conductive first metal (claim 1) or a first metal (claim 11) , the coating being structured as conductor paths. In this regard, the specification discloses that the first metal 2 is structured so that it only locally covers at least one main surface of substrate 1. In particular, the layer made of first metal 2 has the structure of conductor paths that extend on a main surface of substrate 1. (See specification, page 2, lines 9 to 11). The specification also

discloses that silver (highly conductive), in particular, is suitable as the first metal. (See specification, page 2, line 9).

As to claims 1 and 11, they also include the feature of cleaning the at least one coated surface. In this regard, in a following method operation 21 (in Figure 5), the electrically insulating substrate 1 coated with first metal 2 is first thoroughly cleaned. (See specification, page 2, lines 12 to 13).

As to claims 1 and 11, they also include the feature of seeding: the coating (claim 1) or the at least one coated surface(claim 11) with seeds of a second metal. In this regard, in the next method operation 22 (in Figure 5), a seed layer 3a (Figure 2) of a second metal is applied onto the cleaned surface of layer 2. (See specification, page 2, lines 16 to 17).

As to claims 1 and 11, they also include the feature of depositing a layer including an alloy of the second metal onto: the coating seeded with the seeds of the second metal (claim 1) or the at least one seeded coated surface (claim 11). In this regard, in a subsequent method operation 23 (in Figure 5), a continuous layer 3b of the second metal is produced proceeding from seed layer 3a in Figure 2, covering the surface of layer 2 of the first metal on substrate 1. (See specification, page 2, lines 19 to 22).

As to claims 1 and 11, they also include the feature of firing the substrate deposited with the layer to form the conductive layered coating, the firing being performed at a temperature below the melting point of the first metal, the second metal and the alloy. In this regard, in a subsequent method operation 24 (in Figure 5), coated substrate 1 is fired. The firing operation is performed at a temperature from 830 to 870°C, in particular at a temperature of 850°C. (See specification, page 2, lines 29 to 31).

As to claim 1, it further includes the feature of contacting a gold bonding wire to the conductive layered coating. In this regard, the specification discloses that extraordinarily reliable bonding connections may be produced using thin gold bonding wire. (See specification, page 3, lines 8 to 9).

As to claim 1, it further includes the feature in which the substrate includes an LTCC. The specification discloses that a substrate made of LTCC is particularly well suited. (See specification, page 2, line 8).

As to claim 1, it further includes the feature in which the first metal includes silver. The specification discloses that silver, in particular, is suitable as the first metal. (See specification, page 2, line 9).

As to claim 1, it further includes the feature in which the second metal includes palladium. The specification discloses that Palladium is preferably used for the seeding to produce seed layer 3a of the second metal. (See specification, page 2, lines 17 to 18).

In summary, the presently claimed subject matter is to a method for producing a conductive layered coating on an insulating substrate ,including: equipping, in selected regions, at least one surface of an electrically insulating substrate with a coating of an electrically highly conductive first metal, the coating being structured as conductor paths; cleaning the at least one coated surface; seeding the coating with seeds of a second metal; depositing a layer including an alloy of the second metal onto the coating seeded with the seeds of the second metal; firing the substrate deposited with the layer of the second metal to form the conductive layered coating, the firing being performed at a temperature below the melting point of the first metal, the second metal and the alloy; and contacting a gold bonding wire to the conductive layered coating, wherein: the substrate includes an LTCC, the first metal includes silver, and the second metal includes palladium. (See claim 1).

In summary, the presently claimed subject matter is to a *method for producing a conductive layered coating on an electrically insulating substrate ,including: equipping, in selected regions, at least one surface of the electrically insulating substrate with a coating of a first metal structured as a conductor path; cleaning the at least one coated surface; seeding the at least one coated surface with seeds of a second metal; depositing a layer including an alloy of the second metal onto the at least one seeded coated surface; and firing the substrate deposited with the layer to form the conductive layered coating, the firing being performed at a temperature below the melting point of the first metal, the second metal and the alloy. (See claim 11).*

Finally, the appealed claims include no means-plus-function language and no step-plus-function claims, so that 37 C.F.R. 41.37(v) is satisfied as to its specific requirements for such claims, since none are present here. Also, the present application does not contain any step-plus-function claims because the method claims in the present application are not "step

plus function" claims because they do not recite "a step for", as required by the Federal Circuit and as stated in Section 2181 of the MPEP.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claim 14 under 35 U.S.C. § 112 is a duplicate of claim 1.

B. Whether claims 1, 4 to 8 and 11 to 14 under 35 U.S.C. § 103(a) are unpatentable over United States Patent No. 6,406,939 ("Lin") in view of United States Published Patent Application No. 2003/0080392 ("Zuniga-Ortiz"), and United States Patent No. 6,372,539 ("Bayan") and Official Notice.

7. ARGUMENT

A. The Rejection Under 35 U.S.C. § 112 as to Claim 14

Claim 14

Claim 14 was rejected under 35 U.S.C. § 112 as a duplicate of claim 1. Claim 14 depends from claim 13, which depends from claim 12, which depends from claim 11. Therefore, claim 14 includes all the features of claim 11. As to claim 11, its equipping, seeding and depositing features differ from those of claim 1 as described more fully in the summary above. Accordingly, claim 14 is not duplicative of claim 1. It is therefore respectfully requested that the rejection be withdrawn.

B. The Rejections Under 35 U.S.C. § 103(a) as to Claims 1, 4 to 8 and 11 to 14

Claims 1, 4 to 8 and 11 to 14

Claims 1, 4 to 8 and 11 to 14 under 35 U.S.C. § 103(a) are unpatentable over United States Patent No. 6,406,939 ("Lin") in view of United States Published Patent Application

No. 2003/0080392 ("Zuniga-Ortiz"), and United States Patent No. 6,372,539 ("Bayan") and Official Notice. The responses to date are incorporated by reference, as appropriate.

In rejecting a claim under 35 U.S.C. § 103(a), the Office bears the initial burden of presenting a *prima facie* case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim features. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

Still further, the prior art must disclose or suggest each claim feature and it should also provide a motivation or suggestion for combining the features in the manner contemplated by the claim. (See Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990), cert. denied, 111 S. Ct. 296 (1990); In re Bond, 910 F.2d 831, 834 (Fed. Cir. 1990)). Thus, the "problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem", Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 679 (Fed. Cir. 1998).

It is noted that as to the Official Notice, the Office cites as an example, column 8, lines 34 to 40, of the Lin reference to evidence that it is "well known in the art of printed circuit components to fire components to bond them to one another after formation of the components". However, this cited text only refers to *melting conventional solder* to fill the lower part of via holes, so that the solder 610 adheres to sidewalls of the via holes and input/output terminal pads 602 of an integrated circuit chip 601 to provide electrical and mechanical contacts.

In contrast, claim 1 relates to a method for producing a conductive layered coating on an insulating substrate, the method including equipping, in selected regions, at least one surface of an electrically insulating substrate with a coating of an electrically highly

conductive first metal, the coating being structured as conductor paths, cleaning the at least one coated surface, seeding the coating with seeds of a second metal, depositing a layer including an alloy of the second metal onto the coating seeded with the seeds of the second metal, firing the substrate deposited with the layer of the second metal to form the conductive layered coating, and contacting a gold bonding wire to the conductive coating.

In particular, *claim 1 provides that the firing is performed at a temperature below the melting point of the first metal, the second metal and the alloy, and claim 1 further provides that the substrate includes an LTCC, the first metal includes silver, and the second metal includes palladium.* Moreover, "firing" is a term of art that is consistent with the use of ceramics not solder, as provided for by the LTCC substrate of claim 1.

In the Final Office Action of February 2, 2007, the Office acknowledges the fact that the prior art does not specifically teach an LTCC but asserts that it teaches a ceramic substrate at column 5, lines 1 to 2, of the Lin reference. The Office asserts that this would be inclusive of LTCC; however, LTCC refers to a glass-ceramic mixture that is fired at a relatively low temperature that is below the melting point of the metals being used. The Office then asserts that it would have been obvious to use silver as the first metal as taught by the Zuniga-Ortiz reference, and a gold bonding wire as taught by the Bayan reference. However, it is only because LTCC parts are fired at a low temperature that silver and gold conductors can be used. (See specification, page 1, line 16 to 21). Higher temperatures would require the use of refractory metals for circuit traces, which would result in high electrical resistance compared to noble metals. The other references do not disclose – and are not asserted to disclose – the feature in which *the firing is performed at a temperature below the melting point of the first metal, the second metal and the alloy,* as provided for in the context of claim 1.

Accordingly, it is respectfully submitted that Lin, Zuniga-Ortiz, Bayan, and the knowledge the Final Office Action asserts to be well known, whether taken alone or combined, do not disclose or suggest a method of producing a conductive coating on an electrically insulating LTCC substrate, in which selected regions of the surface of the substrate are equipped with a first metal which is seeded with a second metal and thereupon deposited with an alloy of the second metal *and fired at a temperature below the melting*

points of the first metal, the second metal and the alloy, as provided for in the context of the claimed subject matter. Indeed, none of the references cited, or the knowledge asserted to be well known (which is not evidenced by the Lin reference as explained above), even refer to an *LTCC substrate* and *the firing of such a substrate at a temperature below the melting points of metal layers applied thereon*.

As explained above, col. 8, lines 34 to 40, of Lin only refers to applying a temperature to melt solder – which is wholly different than firing an *LTCC substrate at a temperature below the melting point of the first metal, the second metal and the alloy*, as provided for in the context of claim 1.

Thus, it is respectfully submitted that Lin, Zuniga-Ortiz, Bayan, and the knowledge the Office Action asserts to be well known, whether taken alone or combined, do not disclose or suggest the features of *connecting a gold bond wired to the conductive coating formed by the firing of the LTCC substrate at a temperature below the melting point of the first metal, the second metal and the alloy, as provided for in the context of claim 1*. Indeed, none of the references cited, or the knowledge asserted to be well known (which is not conceded), contemplate or suggest such a configuration.

Accordingly, for at least these reasons, claim 1 is allowable.

Claims 4 to 8 depend from claim 1, and therefore are allowable for at least the same reasons as claim 1 as presented.

Claim 11 includes the firing feature like that of claim 1, and is therefore allowable for essentially the same reasons, as are its dependent claims 12 to 14.

Accordingly, claims 1, 4 to 8 and 11 to 14 are allowable.

As further regards all of the obviousness rejections of the claims, *the presently claimed subject matter provides the benefit of a particularly simple and therefore economical method for producing a metal coating in the context of LTCC and ceramic substrates. Previously usual nickel and gold baths can be omitted, so that the process sequence becomes simpler and therefore also more reliable. The coatings produced using the method according to the present invention have proven to be outstandingly suitable for the production of bonding connections.* (See specification, page 1, line 16 to 21). Accordingly, the claimed

subject matter is not obvious since its benefits are evidence of non-obvious as to the references as applied.

As still further regards all of the obviousness rejections of the claims, it is respectfully submitted that a proper *prima facie* case has not been made in the present case for obviousness, since the Office Actions to date never made any findings, such as, for example, regarding in any way whatsoever what a person having ordinary skill in the art would have been at the time the claimed subject matter of the present application was made. (See *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998) (the "factual predicates underlying" a *prima facie* "obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art")). It is respectfully submitted that the proper test for showing obviousness is what the "combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art", and that the Patent Office must provide particular findings in this regard — the evidence for which does not include "broad conclusory statements standing alone". (See *In re Kotzab*, 55 U.S.P.Q. 2d 1313, 1317 (Fed. Cir. 2000) (citing *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1618 (Fed. Cir. 1999) (obviousness rejections reversed where no findings were made "concerning the identification of the relevant art", the "level of ordinary skill in the art" or "the nature of the problem to be solved"))). It is respectfully submitted that there has been no such showings by the Office Actions to date or by the Advisory Action.

In fact, the present lack of any of the required factual findings forces both Appellants and any Appeals Board to resort to unwarranted speculation to ascertain exactly what facts underly the present obviousness rejections. The law mandates that the allocation of the proof burdens requires that the Patent Office provide the factual basis for rejecting a patent application under 35 U.S.C. § 103. (See *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967))). In short, the Examiner bears the initial burden of presenting a proper prima facie unpatentability case — which has not been met in the present case. (See *In re Oetiker*, 977 F.2d 1443, 1445, 24, U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992)).

Accordingly, claims 1, 4 to 8 and 11 to 14 are allowable.

CONCLUSION

In view of the above, it is respectfully requested that the rejections of the finally rejected claims 1, 4 to 8 and 11 to 14 be reversed, and that these claims be allowed as presented.

Respectfully submitted,

Dated: 2/4/2008

By: _____

Gerard A. Messina
(Reg. No. 35,952)

KENYON & KENYON LLP
One Broadway
New York, New York 10004
(212) 425-7200

CUSTOMER NO. 26646

CLAIMS APPENDIX

1. (Previously Presented) A method for producing a conductive layered coating on an insulating substrate, comprising:

equipping, in selected regions, at least one surface of an electrically insulating substrate with a coating of an electrically highly conductive first metal, the coating being structured as conductor paths;

cleaning the at least one coated surface;

seeding the coating with seeds of a second metal;

depositing a layer including an alloy of the second metal onto the coating seeded with the seeds of the second metal;

firing the substrate deposited with the layer of the second metal to form the conductive layered coating, the firing being performed at a temperature below the melting point of the first metal, the second metal and the alloy; and

contacting a gold bonding wire to the conductive layered coating, wherein:

the substrate includes an LTCC,

the first metal includes silver, and

the second metal includes palladium.

2. (Canceled).

3. (Canceled).

4. (Previously Presented) The method as recited in Claim 1, wherein:

in the depositing of the layer of the second metal, palladium is deposited at a ratio of from 0.1 to 50% percent by weight of the alloy.

5. (Previously Presented) The method as recited in Claim 1, wherein:

in the depositing of palladium, the palladium is deposited in such a way that a concentration of greater than 20% percent by weight palladium in the alloy results.

6. (Original) The method as recited in Claim 1, wherein:

the seeding and the depositing are performed according to an electroless

procedure.

7. (Original) The method as recited in Claim 1, wherein:

the firing is performed at a temperature between 830 and 870°C.

8. (Original) The method as recited in Claim 1, wherein:

the firing is performed at a temperature of 850°C.

9 -10. (Canceled).

11. (Previously Presented) A method for producing a conductive layered coating on an electrically insulating substrate, comprising:

equipping, in selected regions, at least one surface of the electrically insulating substrate with a coating of a first metal structured as a conductor path;

cleaning the at least one coated surface;

seeding the at least one coated surface with seeds of a second metal;

depositing a layer including an alloy of the second metal onto the at least one seeded coated surface; and

firing the substrate deposited with the layer to form the conductive layered coating, the firing being performed at a temperature below the melting point of the first metal, the second metal and the alloy.

12. (Previously Presented) The method of claim 11, wherein the substrate includes an LTCC;

13. (Previously Presented) The method of claim 12, wherein the first metal includes silver and the second metal includes palladium.

14. (Previously Presented) The method of claim 13, further comprising:

contacting a gold bonding wire to the conductive coating.

EVIDENCE APPENDIX

Appellants have not submitted any evidence pursuant to 37 CFR Sections 1.130, 1.131 or 1.132, and do not rely upon evidence entered by the Examiner.

RELATED PROCEEDINGS INDEX

There are no interferences or other appeals related to the present application.